UECM1404 Theory of Interest

Test 1 Practice

UNIVERSITI TUNKU ABDUL RAHMAN

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Q1. Jeff puts 1000 into a fund that pays an effective annual rate of discount of 20% for the first two years and a force of interest of rate $\delta = 2/(16-t), 2 \leq t \leq 4$, for the next two years. At the end of four years, the amount in Jeff's account is the same as what it would have been if he had put 1000 into an account paying interest at the nominal rate of i per annum compounded quarterly for four years. Calculate i.

Q2. A loan of 8,000 is made at an interest rate of 8% compounded quarterly. The loan is to be repaid with three payments: 3,200 at the end of first year, 6,400 at the end of 4-th year, and the balance at the end of the tenth year. Calculate the amount of final payment.

Q3. You are given $\delta_t = \frac{2}{1+t}$. A payment of 330 at the end of 3 years and 660 at the end of 6 years has the same present value as a payment of 180 at the end of 2 years and X at the end of 5 years. Calculus X.

Q4. Kenton borrows 210,000 on January 1, 2023 to be repaid in 24 semiannual annual installments at an effective annual rate of interest of 11%. The first payment is due on January 1, 2024. Instead of semiannual payment he decides to make monthly payments equal to one-sixth of the semiannual payment beginning on February 1, 2023. Dertermine how many months will be needed to pay off the loan.

Q5. Tom borrows 400 at an annual effective interest rate of 4% and agrees to repay it with 30 annual installments. The amount of each payment in the last 20 years is set at twice that in the first 10 years. At the end of 10 years, Tom has the option to repay the entire loan with a final payment X, in addition to the regular payment. This will yield the lender an annual effective rate of 6.6000000000000005% over the 10-year period. Calculate X.

Q6. Annual deposits of 160 are made at the beginning of each year for 20 years. Find the accumulated value at the end of 20 years if the effective rate of interest is 6% for the first 6 years and 5% for the last 14 years.